Optimal C:N ratio for the production of red pigments By Monascus ruber

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Abstract

The carbon-to-nitrogen (C:N) ratio in the biomass of microfungi tends to be quite different (e.g. 10–15) compared with the C:N ratio in the red pigments (e.g. >20) of the fungus *Monascus ruber*. Therefore, determining an optimal C:N ratio in the culture medium for maximizing the production of the pigments is important. A culture medium composition is established for maximizing the production of the red pigment by the fungus *M. ruber* ICMP 15220 in submerged culture. The highest volumetric productivity of the red pigment was 0.023 AU L^{-1} h^{-1} in a batch culture (30 °C, initial pH of 6.5) with a defined medium of the following composition (g L^{-1}): glucose (10), monosodium glutamate (MSG) (10), $MgSO_4 \cdot 7H_2O$ (0.5), KH_2PO_4 (5), K_2HPO_4 (5), $ZnSO_4 \cdot 7H_2O$ (0.01), $FeSO_4 \cdot 7H_2O$ (0.01), $CaCl_2$ (0.1), $MnSO_4 \cdot H_2O$ (0.03). This medium formulation had a C:N mole ratio of 9:1. Under these conditions, the specific growth rate of the fungus was 0.043 h^{-1} and the peak biomass concentration was 6.7 g L^{-1} in a 7-day culture. The biomass specific productivity of the red pigment was 1.06 AU g^{-1} h^{-1}. The best nitrogen source proved to be MSG although four other inorganic nitrogen sources were evaluated.

Keywords
Monascus ruber; Food colorants; Red pigments; Submerged culture